Space Weather Forecast

Issued on Wednesday, 14 February 2024 at 01:28 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

Space Weather Forecast Headline: Chance G1 Minor Geomagnetic Storms Day 1 (14 Feb) due to coronal mass ejection arrival. Ongoing chance of isolated Moderate flares, and slight chance Strong flares. Minor Solar Radiation Storm easing.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Low with only common class flares observed, the largest at 13/0759 UTC from a region over the northeast limb. There are seven sunspot regions on the Earth-facing disc, with the largest region is in the southwest. While this region lost some small trailer spots, growth was observed to the north and south of the main leader spot, with ongoing magnetic complexity including some reverse polarity spots. The two moderate sized regions in the north disc showed little sign of development, though the westernmost one was slightly more active with some common class flares observed.

No Earth-directed coronal mass ejections (CMEs) were observed in available imagery.

Solar Wind / Geomagnetic Activity: Solar winds showed the arrival of a weak CME at 13/0140 UTC, likely a glancing arrival of the first of the 10 Feb CMEs, which was anticipated to pass mainly to the south of Earth. Solar winds showed a small jump to elevated levels (from 440 km/s to 480-510km/s). These winds then gradually eased to 400-450km/s by 13/0730 UTC, and continued through 13 Feb. Interplanetary magnetic field (IMF) also showed a small jump at 13/0140 UTC, but only from very weak to weak values, and then persisted at this level. The north-south directed field became mainly negative (southward) but was also weak with only brief positive (northward) spells observed. Geomagnetic activity was mostly Quiet to Unsettled (Kp1-3), but with one Active (Kp4) interval 13/1500-1800 UTC.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) has been above the Minor Radiation Storm level throughout and briefly increased above the Moderate Radiation Storm level (at times between 13/0440 UTC and 13/0915UTC), but has since followed a declining trend.

Four-Day Space Weather Forecast Summary

Solar Activity: Low to Moderate activity is expected with isolated Moderate flares, and a slight chance of Strong flares. These most likely from the large region in the southwest, or perhaps from a new region rotating onto the northeast limb.

Solar Wind / Geomagnetic Activity: There is one CME anticipated to arrive at Earth, originally forecast to arrive on 13 Feb, but perhaps arriving early on day 1 (14 Feb). This is from the Moderate flare on 10 Feb. No other enhancements are expected, with solar winds likely easing to background once any CME influence eases. A spell of Active to G1 Minor Storm's is expected with the CME arrival, with a slight chance of G2 Moderate Storms. These could persist for much of day 1 (14 Feb). Otherwise mainly Quiet activity expected, with a decreasing chance of Unsettled intervals.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is at S1 Minor Radiation Storm levels, but expected to continue declining through the

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period. This likely falling below the S1 level on later day 1 (14 Feb), but continuing above background levels. Further enhancements are possible though, mainly from any significant flaring from the large sunspot in the southwest disc.

Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	60	10	1	1
Strong	G3	No	5	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	No	70	70	70	60
Very Active	R3 to R5 X	No	15	15	15	10

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	Yes	100	30	20	20
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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